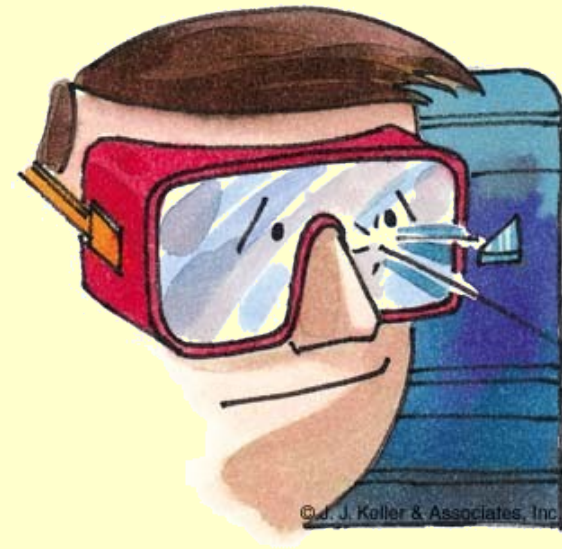


Hand & Portable Powered Tools



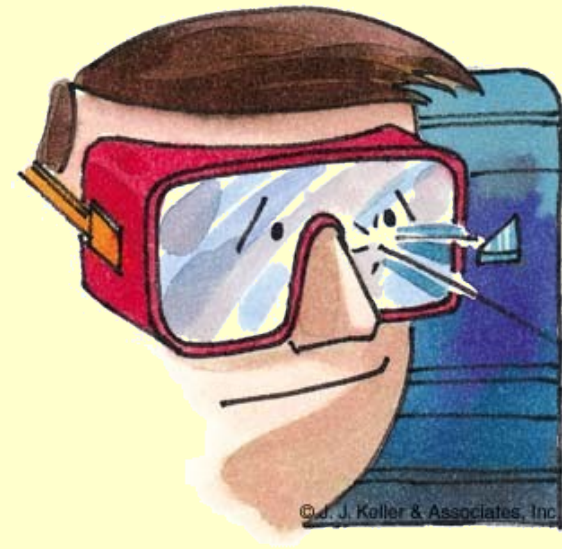
Injuries caused by hand & portable powered tools

- ❖ Serious eye injuries can result if materials shatter while using
 - hammers
 - mallets
 - powered impact tools



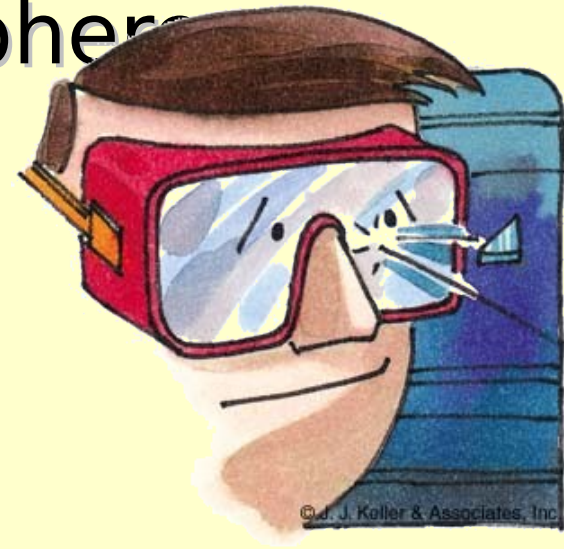
Injuries caused by hand & portable powered tools

- ❖ Chiseling, filing, grinding, sawing generates chips that can get in your eyes
- ❖ If you're looking up to work overhead, any type of tool use could cause dust or debris to fall into your eyes



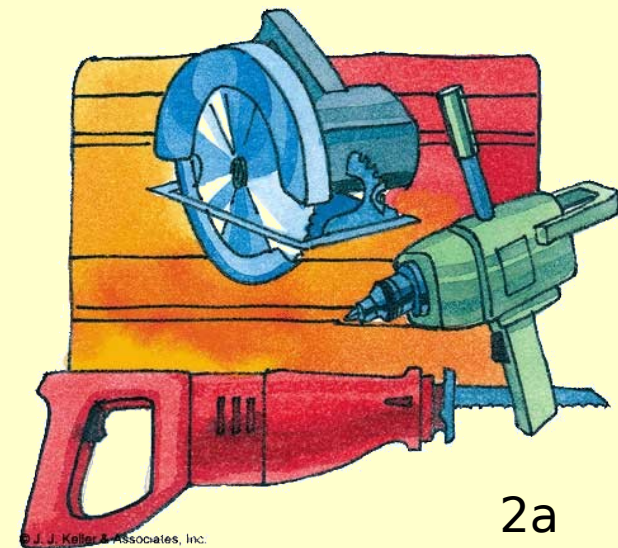
Injuries caused by hand & portable powered tools

- ❖ Other serious injuries can result if the wrong type of tool is used
- ❖ Tool use in areas where there may be a flammable atmosphere requires the use of
 - non-sparking hand tools
 - specially rated electric power tools



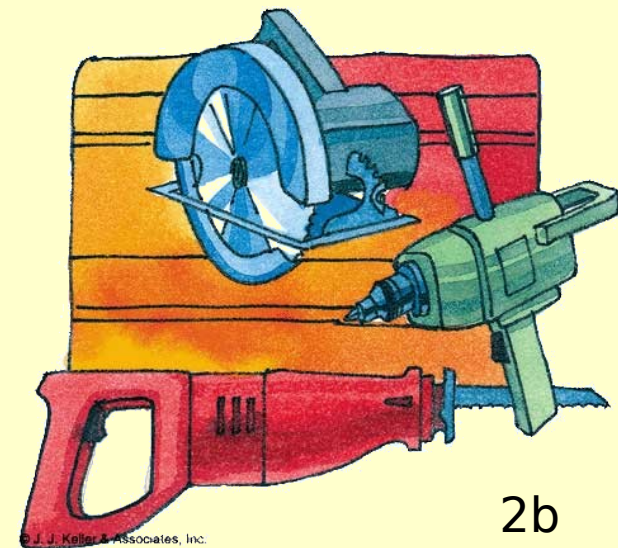
Tool quality and design

- ❖ Tools made from good quality, durable materials will help avoid injuries caused by tools breaking or slipping



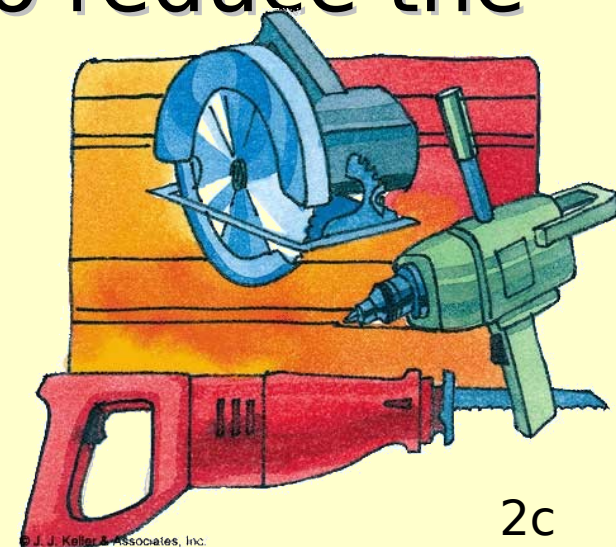
Tool quality and design

- ❖ Metal tool parts should be strong enough to resist:
 - bending
 - cracking
 - chipping
 - excessive wear from normal use



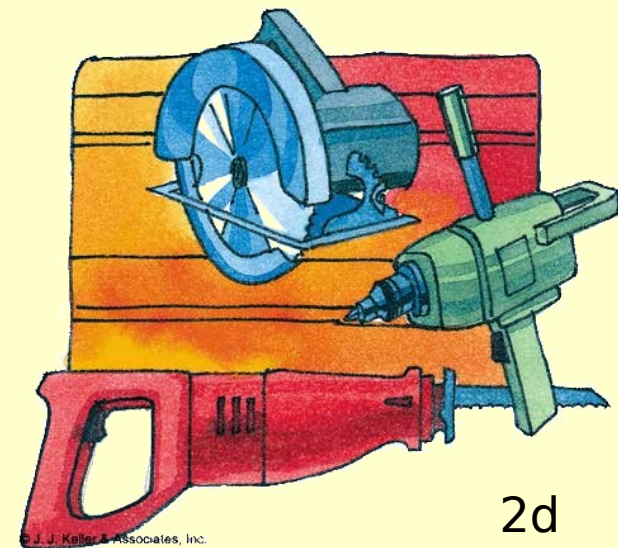
Tool quality and design

- ❖ Handles should be shaped to comfortably fit the hand
- ❖ Non-sparking hand tools are made of non-ferrous alloys to reduce the likelihood that they will cause a spark



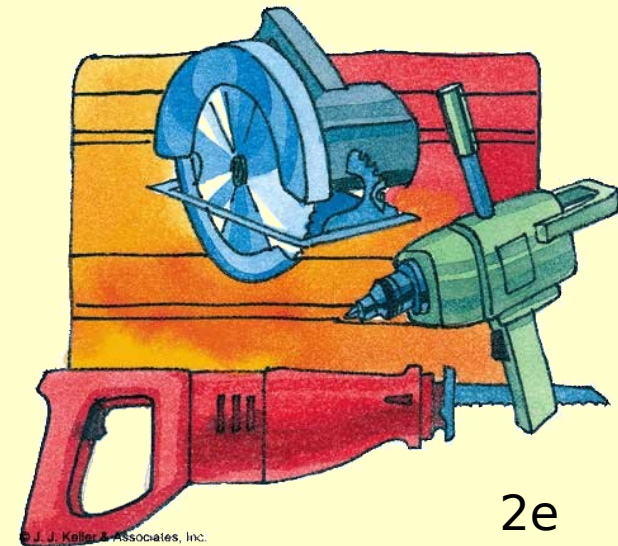
Tool quality and design

- ❖ Always use the appropriate blades, bits, fasteners with powered tools
- ❖ Tools work best when you can easily hold, move, and use the tool



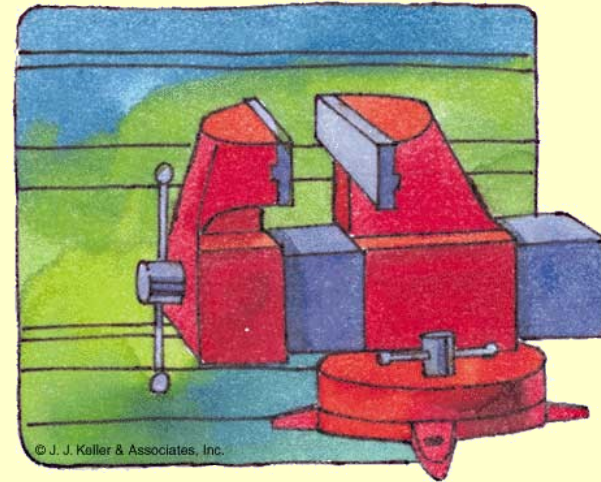
Tool quality and design

- ❖ Avoid using tools that are too heavy or large for you to control



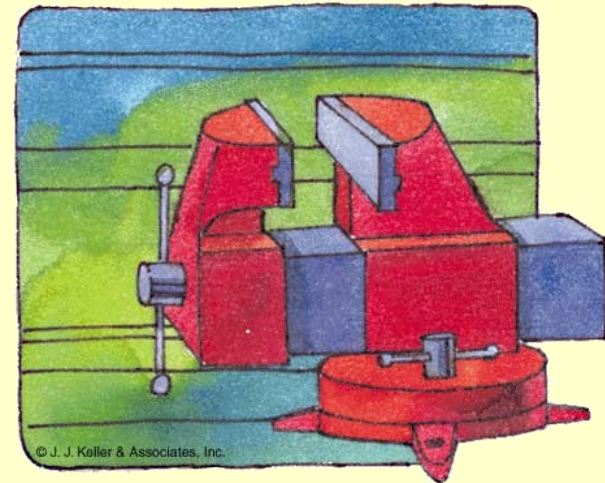
Job set-up

- ❖ You want to easily reach your work without:
 - straining muscles
 - applying force in awkward positions
 - bending, twisting
 - overextending your reach



Job set-up

- ❖ Use a vise, clamps, or other means to secure the parts that you are working on
- ❖ While using the tool, take care that any chips or debris will be directed away from yourself and others



Protective equipment

- ❖ Using personal protective equipment (PPE) should become a habit
- ❖ Wear eye protection if there is a chance that chips, splashes, sparks, dust, or debris could get into your eyes



Protective equipment

❖ Some examples of jobs where eye protection should be worn include using:

- hammers
- mallets
- chisels
- punches
- bolt cutters



Protective equipment

- ❖ Some examples of jobs where eye protection should be worn include using:
 - staple guns
 - drills
 - abrasive wheels
 - saws
 - any other tool that could create chips, pieces, or splashes



Protective equipment

- ❖ Eye protection is required when using explosive actuated tools
- ❖ You can protect yourself from cuts while handling knives by wearing cut-resistant gloves



Protective equipment

- ❖ Another type of protective glove is made with a material that absorbs vibration and the shock of impacts
- ❖ Ear protection may be in order when using powered tools



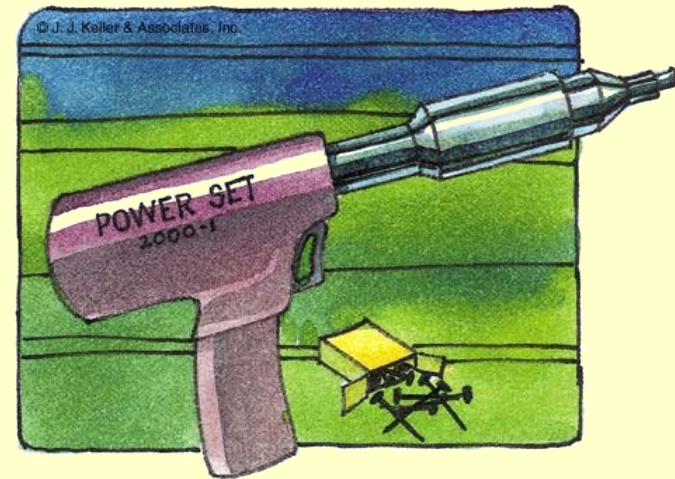
Protective equipment

- ❖ Tool use may require the use of a respirator



Tool inspection

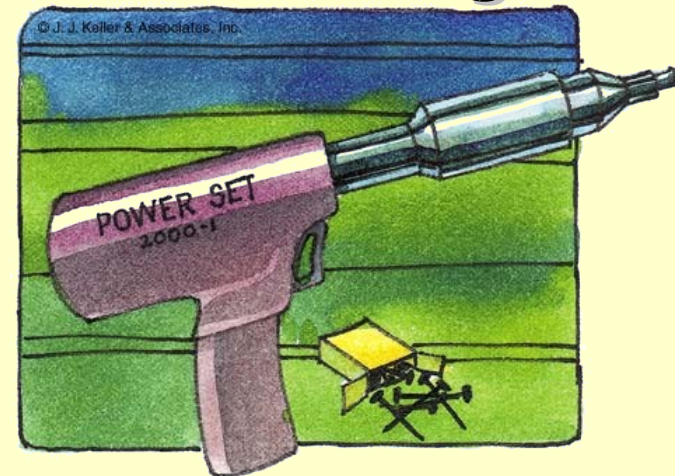
- ❖ Tools should be inspected before and after each use



Tool inspection

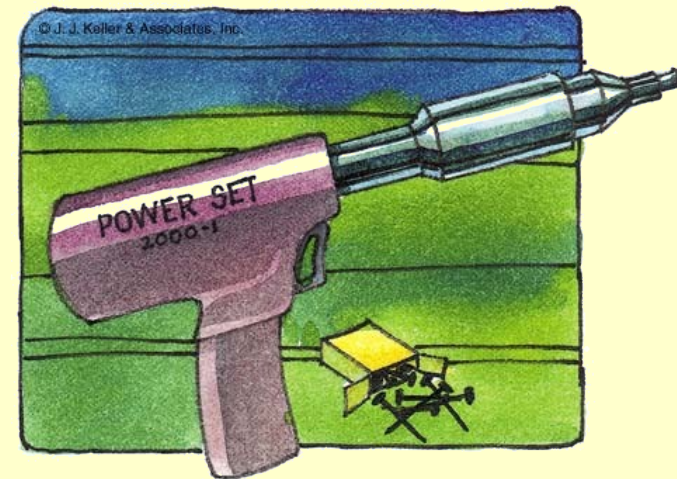
Some signs of damage and wear to look for include:

- ❖ Cracked or loose handles, casings, or guards
- ❖ Bent shafts or spindles
- ❖ Worn, cut, brittle, or frayed cords and hoses



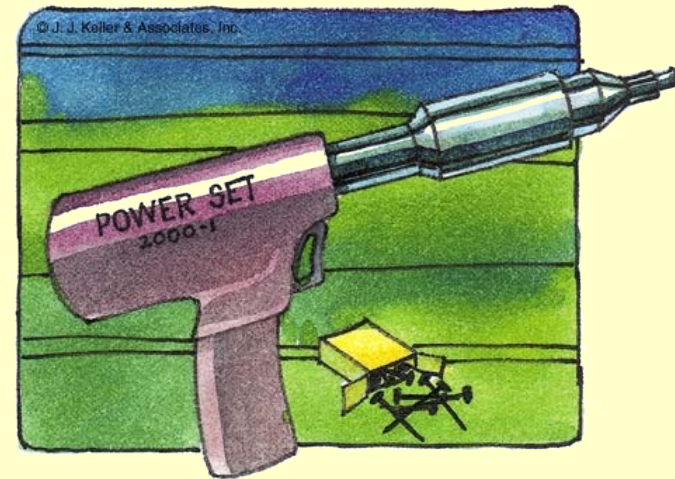
Tool inspection

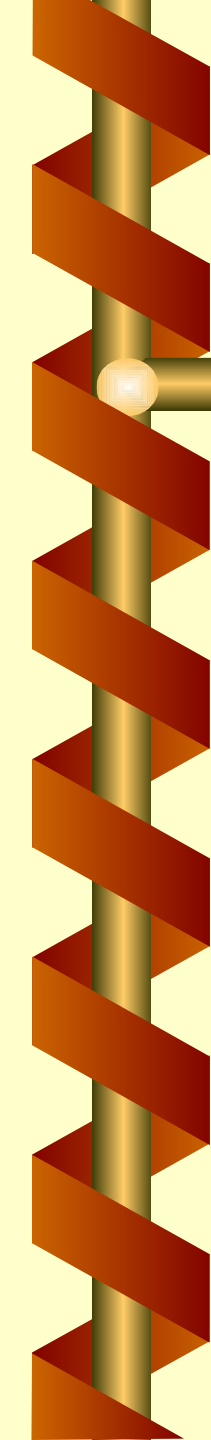
- ❖ Loose or leaking fittings
- ❖ Dull, rounded, or chipped cutting surfaces



Tool inspection

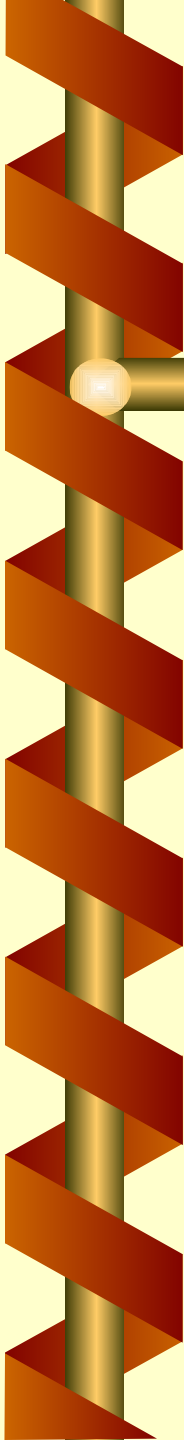
- ❖ Gouges or scrapes on gripping surfaces
- ❖ Mushroomed striking surfaces





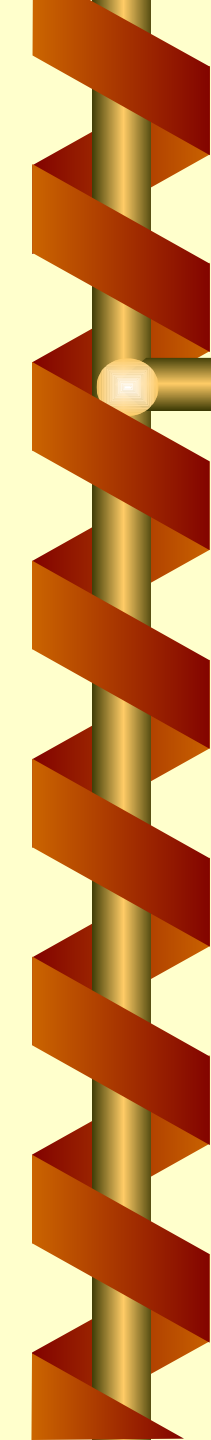
Tool maintenance and repair

- ❖ Portable tools should be kept clean
- ❖ Maintain and repair tools before it's too late
- ❖ Sharpen cutting edges regularly



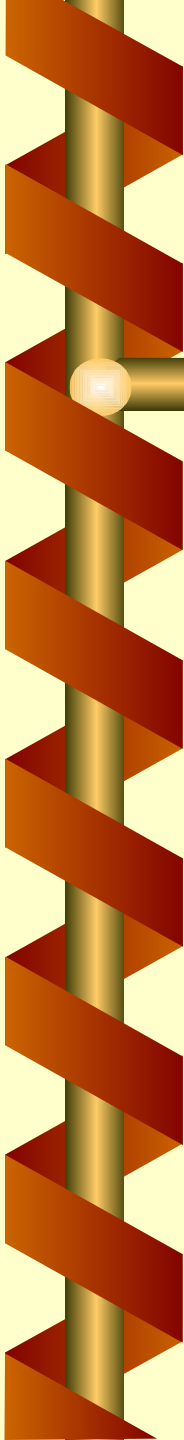
Tool maintenance and repair

- ❖ Follow a schedule to make sure tools get lubricated
- ❖ To prevent rust, lightly oil tools before putting them away
- ❖ Take damaged tools out of service immediately



Tool maintenance and repair

- ❖ Only authorized employees should be allowed to repair tools
- ❖ Some types of tools must meet the manufacturer's specifications after they've been repaired

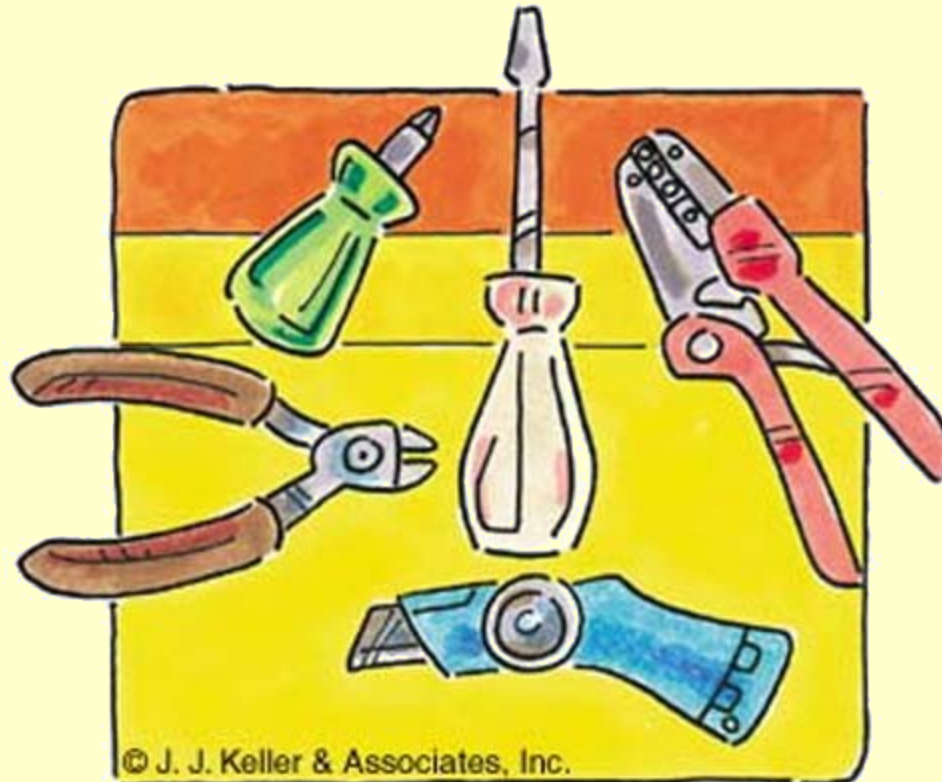


Tool maintenance and repair

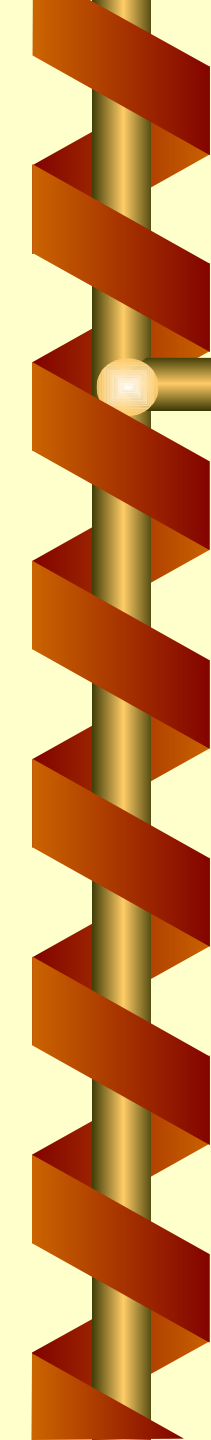
- ❖ All repaired tools should be thoroughly inspected before they are put back into use
- ❖ Discard damaged tools that cannot be repaired
- ❖ Use tool boxes or tool chests to keep tools organized

Using different types of hand tools

- ❖ Hand tools are non-powered



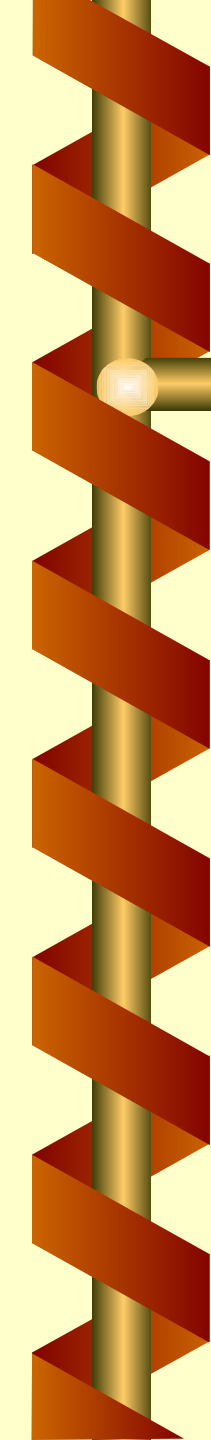
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Using different types of hand tools

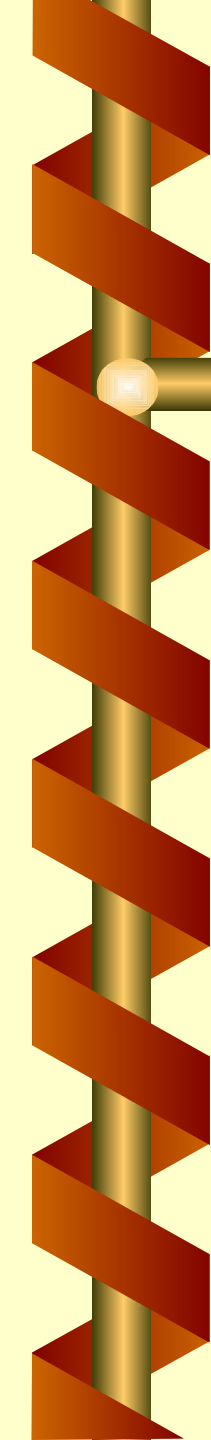
The greatest hazards posed by hand tools result from misuse and improper maintenance:

- ❖ Using a screwdriver as a chisel may cause the tip of the screwdriver to break and fly, hitting the user or other employees



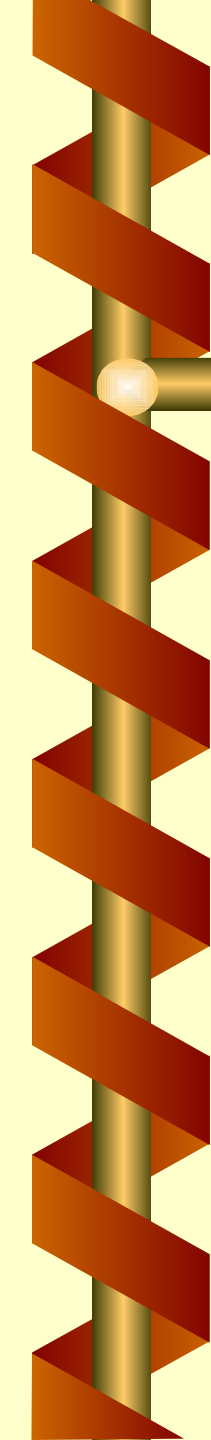
Using different types of hand tools

- ❖ If a wooden handle on a tool is loose, splintered, or cracked, the head of the tool may fly off and strike the user or another worker
- ❖ A wrench might slip if its jaws are sprung



Using different types of hand tools

- ❖ Impact tools such as chisels, wedges, or drift pins are unsafe if they have mushroomed heads

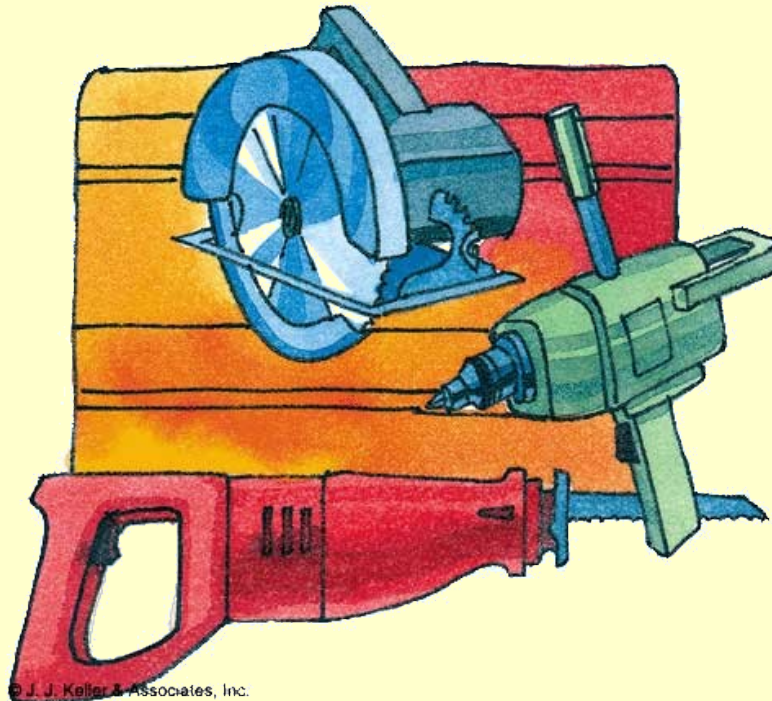


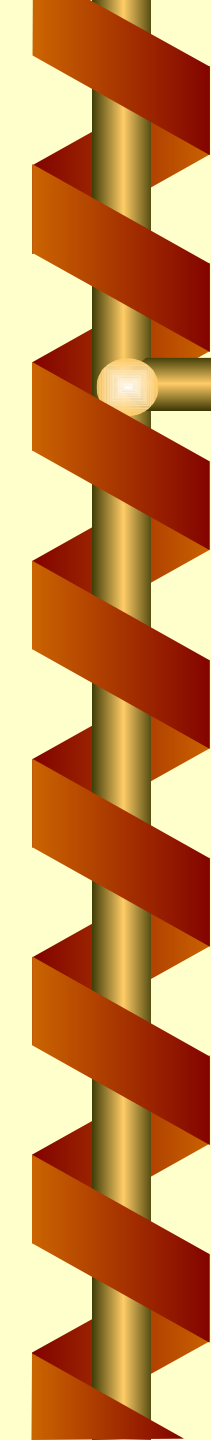
Using different types of hand tools

- ❖ Types of hand tools include the following:
 - Hammers and Mallets
 - Pliers
 - Cutters
 - Wrenches
 - Wood saws
 - Hack saws
 - Knives
 - Screwdrivers

Precautions for power tool use

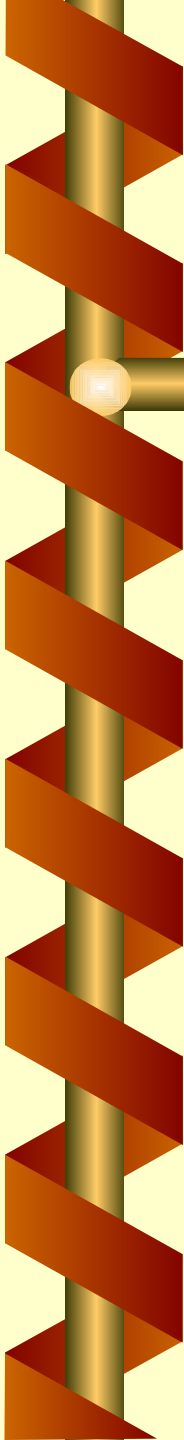
- ❖ Power tools can be hazardous when improperly used





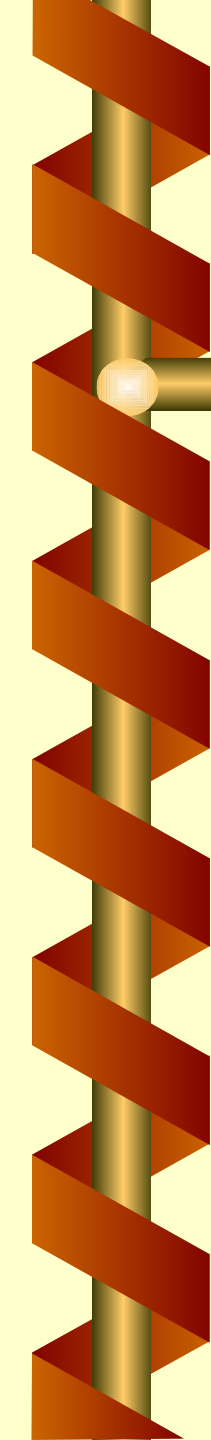
Precautions for power tool use

- ❖ There are several types of power tools, based on the power source they use:
 - electric
 - pneumatic
 - liquid fuel
 - hydraulic
 - explosive-actuated



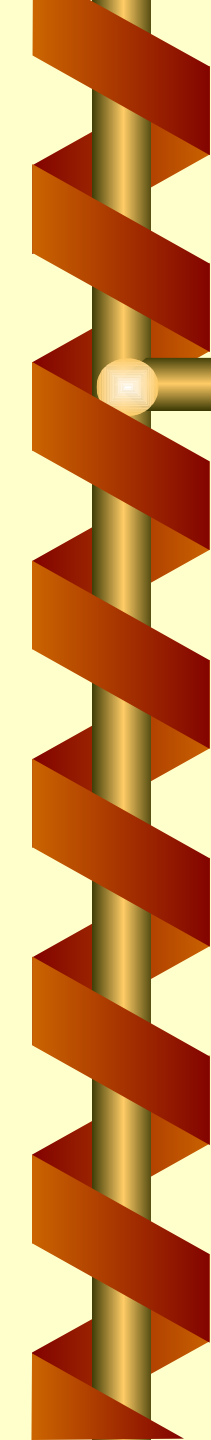
Precautions for power tool use

- ❖ Never carry a tool by the cord or hose
- ❖ Never yank the cord or the hose to disconnect it from the receptacle
- ❖ Keep cords and hoses away from heat, oil, and sharp edges



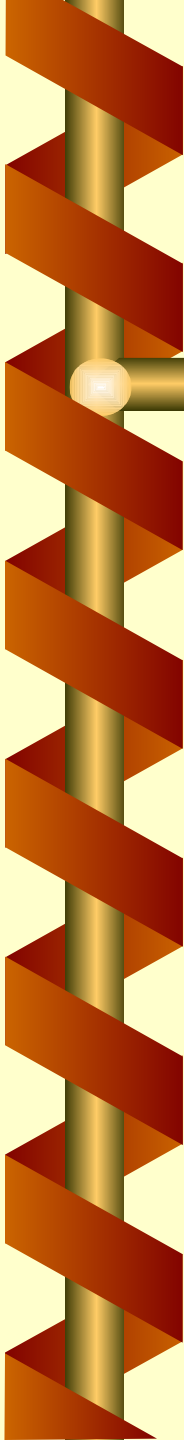
Precautions for power tool use

- ❖ Disconnect tools when not in use, before servicing, and when changing accessories
- ❖ Keep observers a safe distance away from the work area
- ❖ Avoid accidental starting



Precautions for power tool use

- ❖ Tools should be maintained with care
- ❖ Be sure to keep good footing and maintain good balance

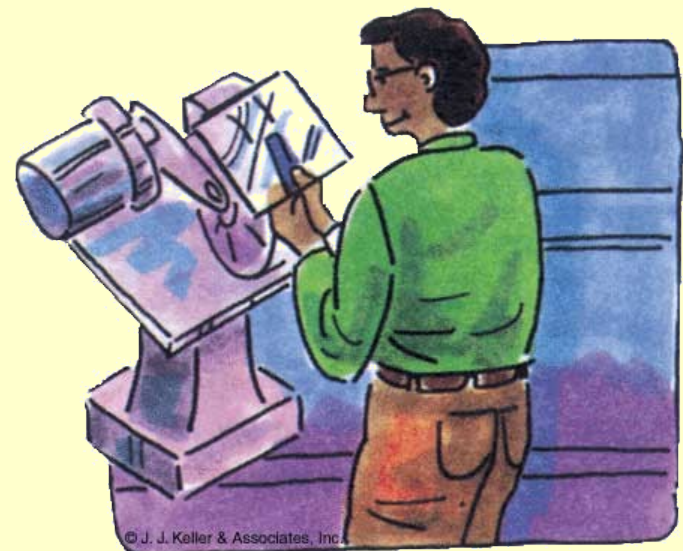


Precautions for power tool use

- ❖ Wear proper apparel - loose clothing or jewelry can get caught in moving parts
- ❖ All portable electric tools that are damaged are to be removed from use and tagged “Do Not Use.”

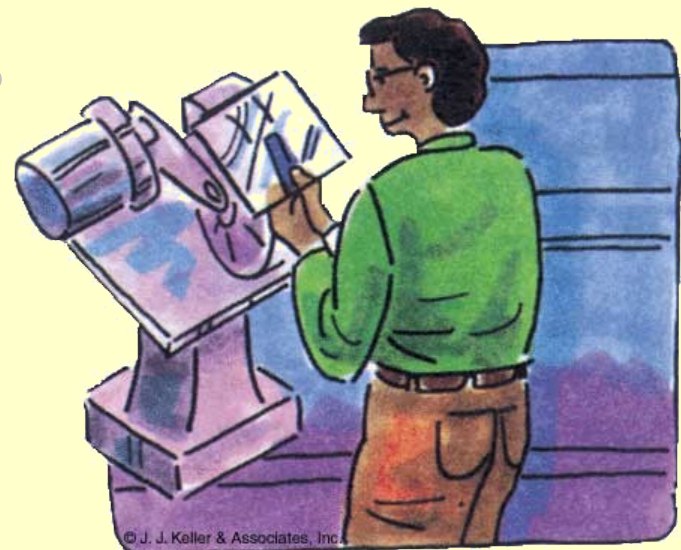
Guards

- ❖ Hazardous moving parts of a power tool need to be safeguarded



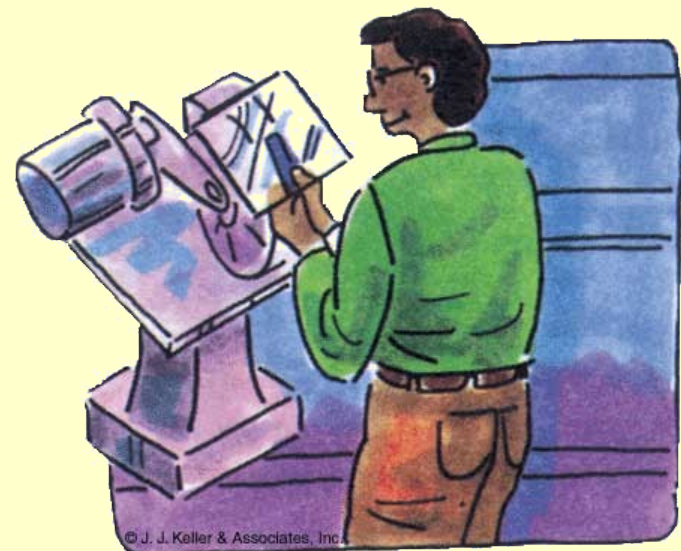
Guards

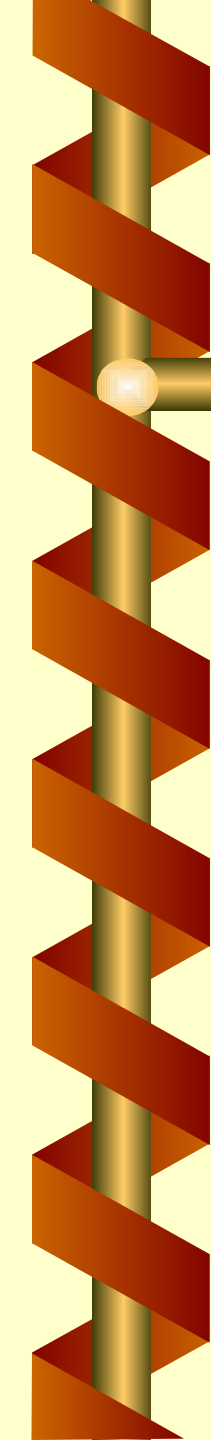
- ❖ Guards protect the operator and others from the following:
 - Point of operation
 - In-running nip points
 - Rotating parts
 - Flying chips and sparks



Guards

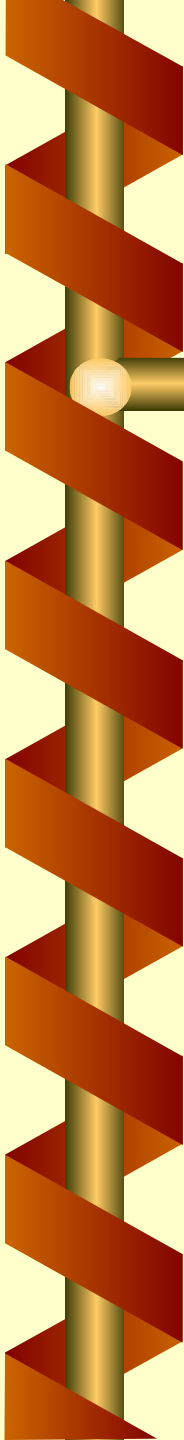
- ❖ Safety guards must never be removed when a tool is being used





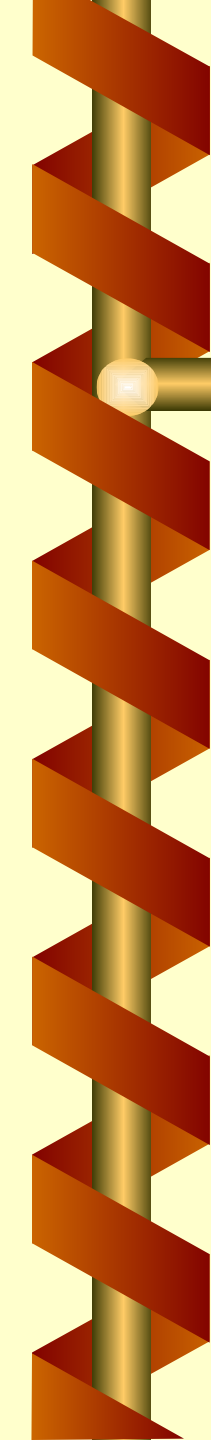
Safety switches

- ❖ The following hand-held powered tools must be equipped with a constant-pressure switch or control. They may also be equipped with a “lock-on” control:



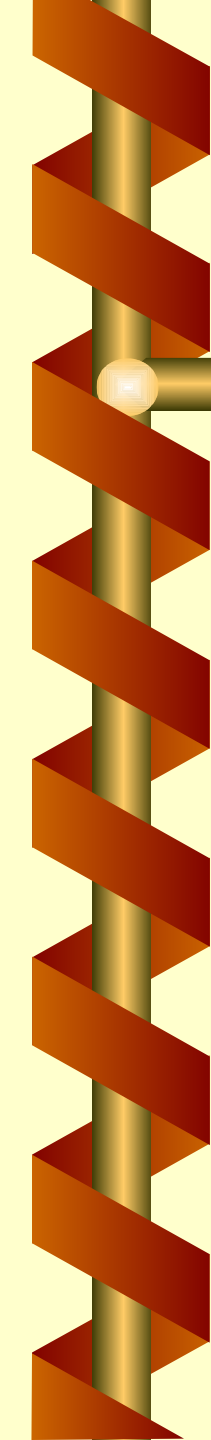
Safety switches

- ❖ drillstappers
- ❖ fastener drivers
- ❖ horizontal, vertical and angle grinders with wheels larger than 2 inches in diameter
- ❖ disc sanders with discs larger than 2 inches



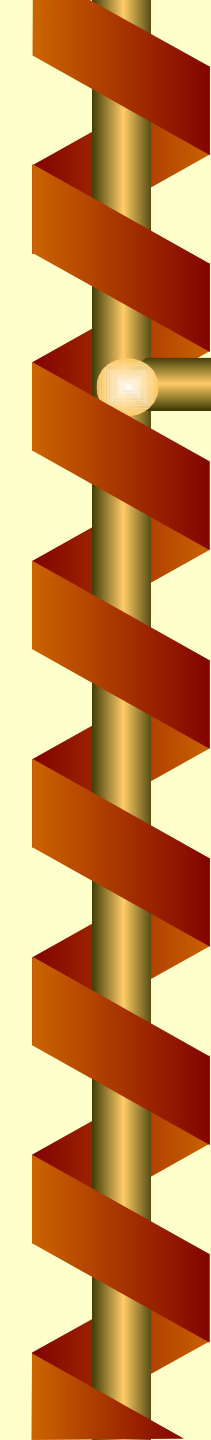
Safety switches

- ❖ belt sanders
- ❖ reciprocating saws
- ❖ saber saws
- ❖ scroll saws
- ❖ jigsaws with blade shanks greater than 1/4 inch wide



General precautions for electric power tools

- ❖ Operate electric tools within their design limitations
- ❖ Use gloves and appropriate safety footwear when using electric tools
- ❖ Store electric tools in a dry place when not in use



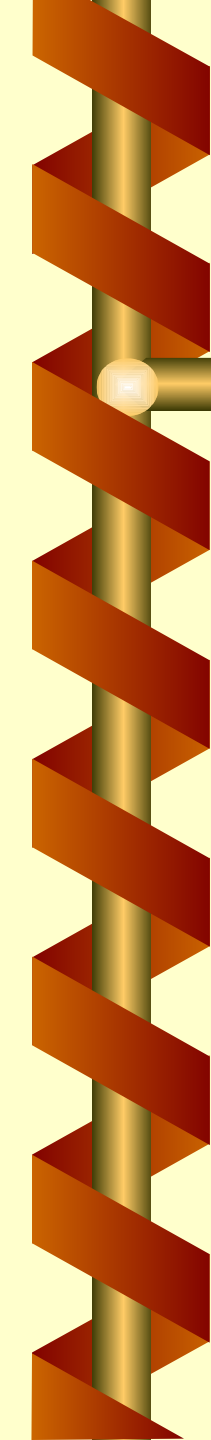
General precautions for electric power tools

- ❖ Do not use electric tools in damp or wet locations unless they are approved for that purpose
- ❖ Keep work areas well-lit when operating electric tools

General precautions for electric power tools

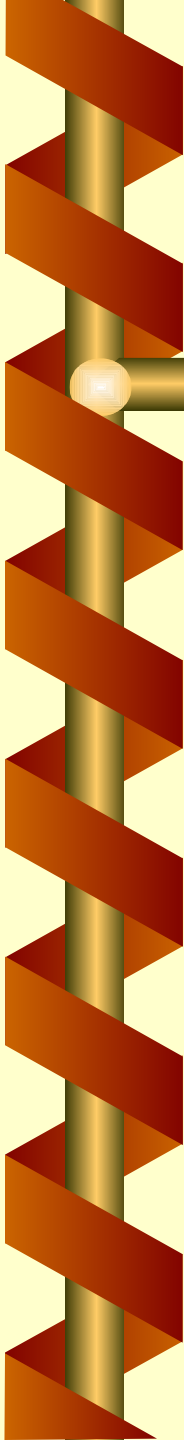
- ❖ Ensure that power cords do not present a tripping hazard





Electrocution and shock

- ❖ Electric-powered tools can cause burns and slight shocks which can lead to injuries or even heart failure
- ❖ Even a small amount of current can result in fibrillation of the heart and death

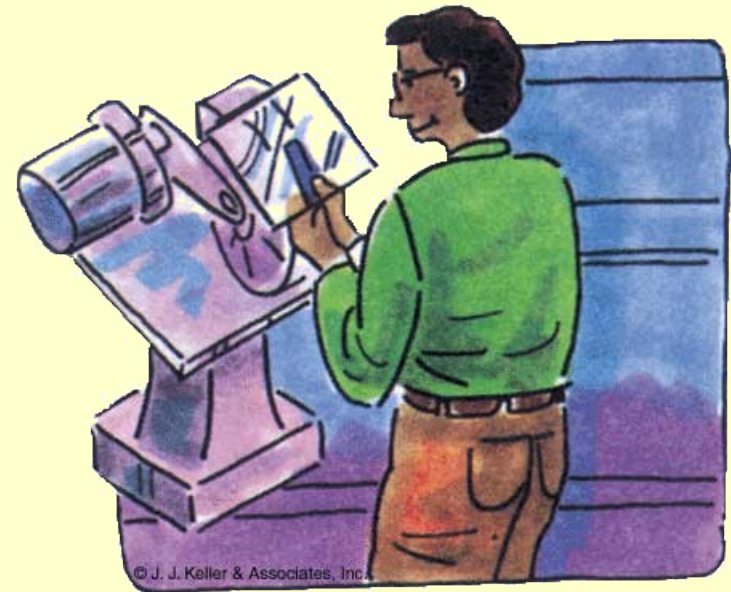


Electrocution and shock

- ❖ To protect the user from shock, tools must either:
 - have a three-wire cord with ground and be plugged into a grounded receptacle
 - be double insulated
 - be powered by a low-voltage isolation transformer

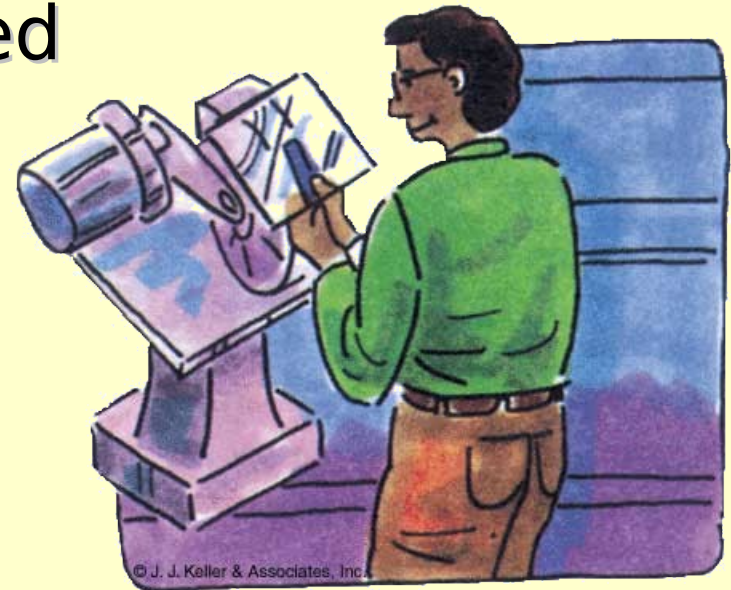
Powered abrasive wheel tools

- ❖ Powered abrasive wheels create special safety problems because they may throw off flying fragments



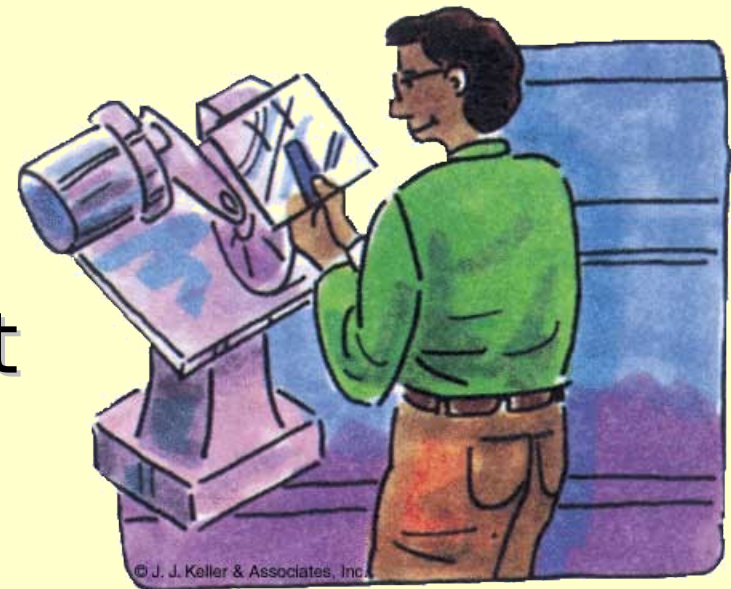
Powered abrasive wheel tools

- ❖ Before an abrasive wheel is mounted, it should be:
 - inspected closely
 - sound- or ring-tested



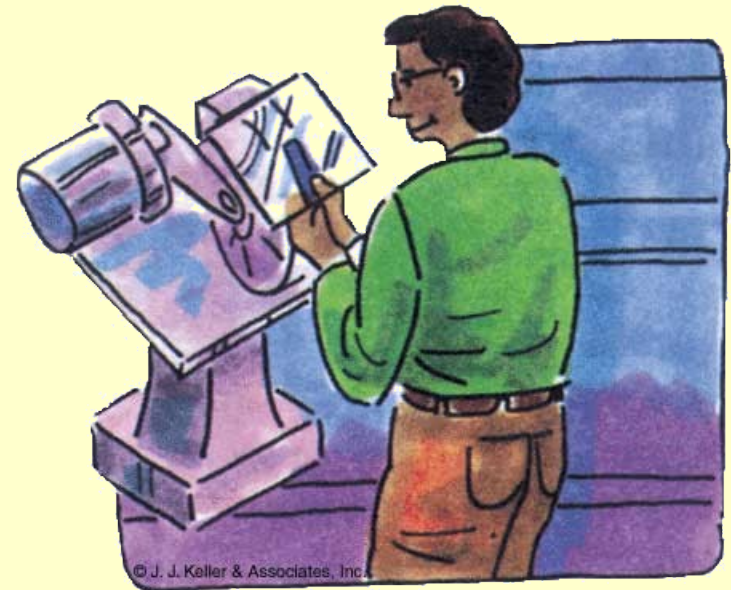
Powered abrasive wheel tools

- ❖ To test, wheels should be tapped gently with a light non-metallic instrument
- ❖ If they sound cracked or dead, they could fly apart in operation



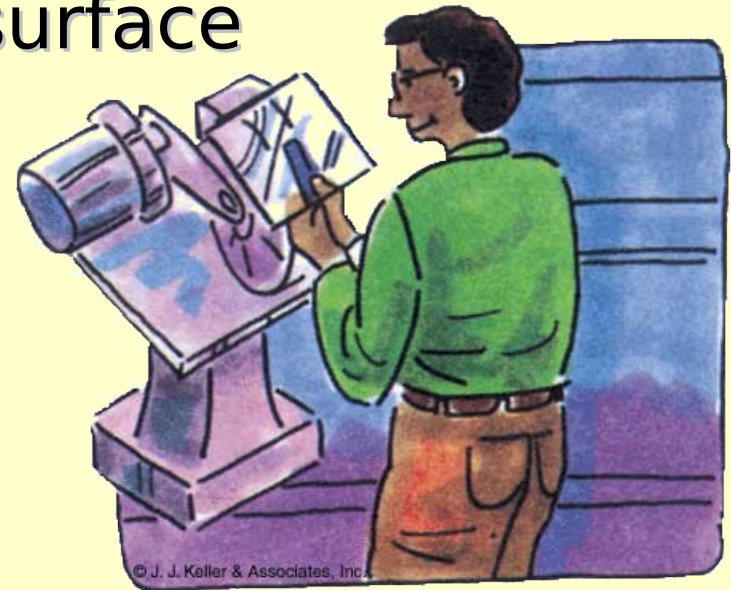
Powered abrasive wheel tools

- ❖ A sound and undamaged wheel will give a clear metallic tone or “ring”



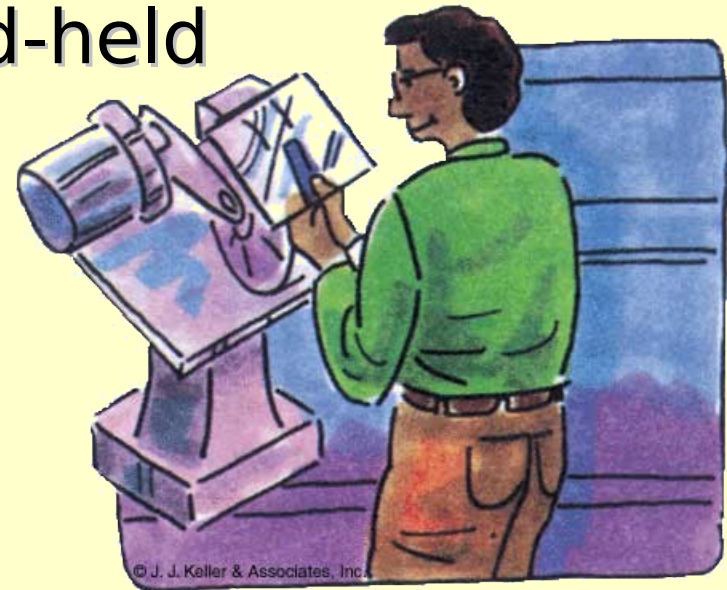
Powered abrasive wheel tools

- ❖ Portable grinding tools need to be equipped with safety guards to protect workers from:
 - the moving wheel surface
 - flying fragments in case of breakage



Powered abrasive wheel tools

- ❖ When using a powered grinder:
 - always use eye protection
 - turn off the power when not in use
 - never clamp a hand-held grinder in a vise



Pneumatic tools

- ❖ Pneumatic tools are powered by compressed air and include:
 - chippers
 - drills
 - hammers
 - sanders



Pneumatic tools

- ❖ The main danger in using pneumatic tools is the hazard of getting hit by:
 - one of the tool's attachments; or
 - a fastener being used with the tool



Pneumatic tools

- ❖ Eye protection is required and face protection is recommended
- ❖ Check to see that the tool is fastened securely to the hose – use a locking device



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Pneumatic tools

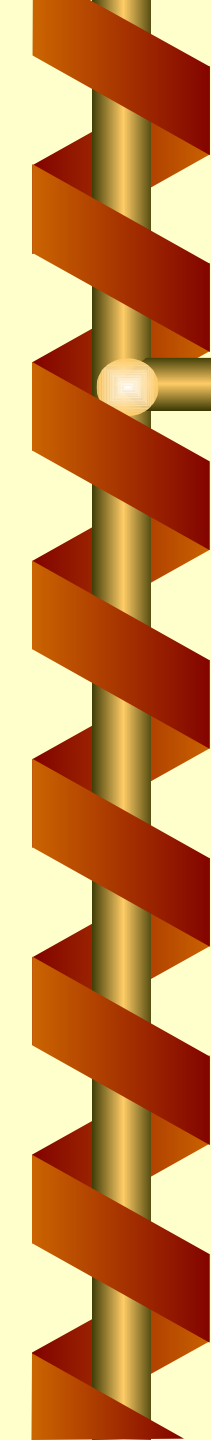
- ❖ Set up screens to protect nearby workers from being struck by flying fragments around:
 - chippers
 - riveting guns
 - staplers
 - air drills



Pneumatic tools

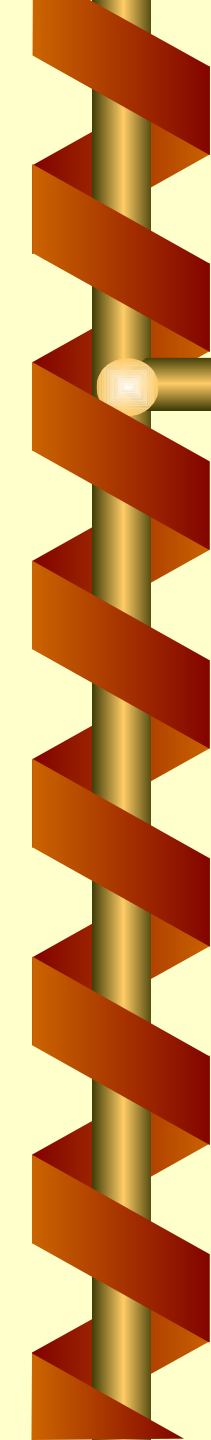
- ❖ Use hearing protection when working with noisy tools such as jackhammers





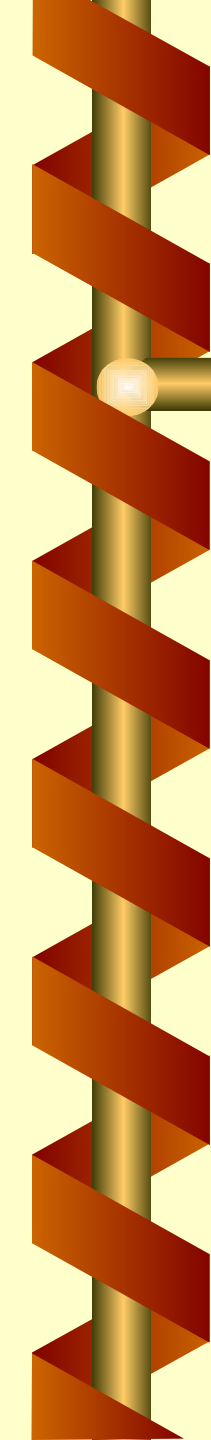
Compressed air

- ❖ Compressed air cannot be used for cleaning purposes unless:
 - the pressure is reduced to less than 30 p.s.i.
 - effective chip guarding is used
 - personal protective equipment is used



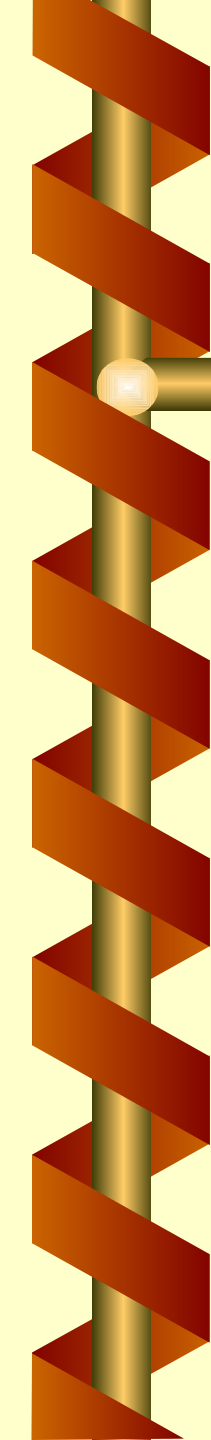
Compressed air

- ❖ Methods for pressure reduction include:
 - Reducing the air compressor pressure level
 - Fitting the air source with a relief device to release the air when the nozzle is dead-ended



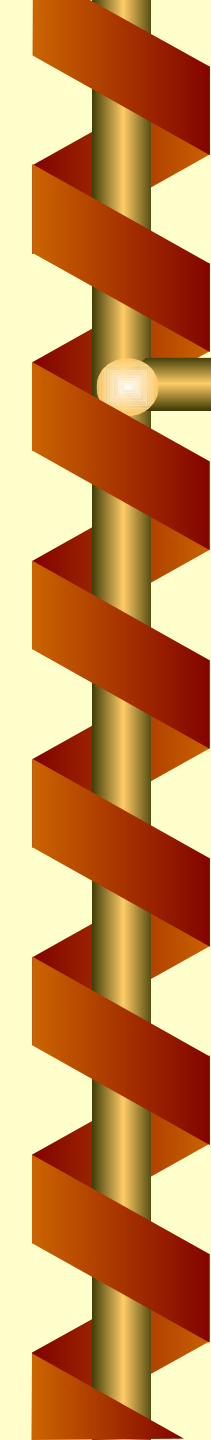
Compressed air

- ❖ Methods for pressure reduction include:
 - Installing an air nozzle with holes that will reduce the air pressure to less than 30 p.s.i. when the nozzle is dead-ended



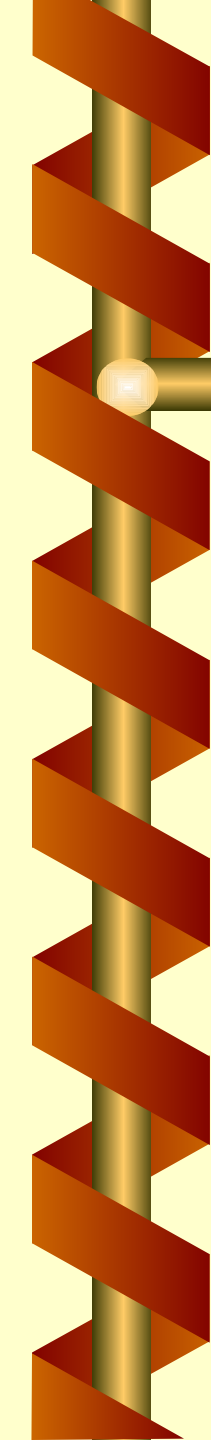
Compressed air

- ❖ Never point compressed air guns toward anyone
- ❖ Never “dead-end” an air gun against yourself



Compressed air

- ❖ Compressed air typically contains chips, oil particles, and other debris that can cause serious injuries to eyes, ears, and even intact skin
- ❖ Use a brush to remove dust and debris from clothing

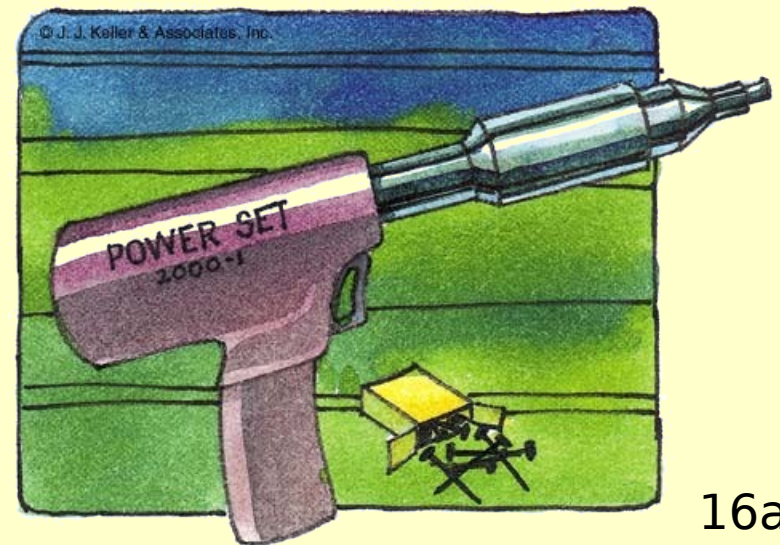


Compressed air

- ❖ Wearing disposable coveralls will also help keep employees' clothing clean during dusty jobs

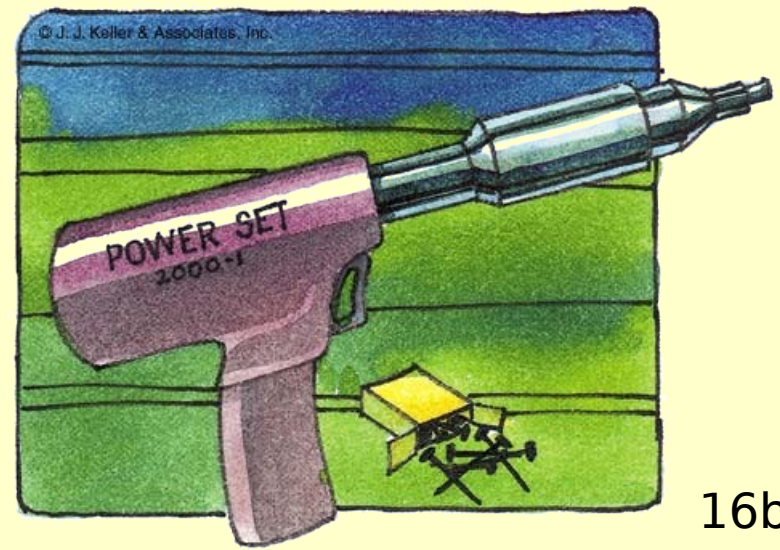
Explosive-actuated tools

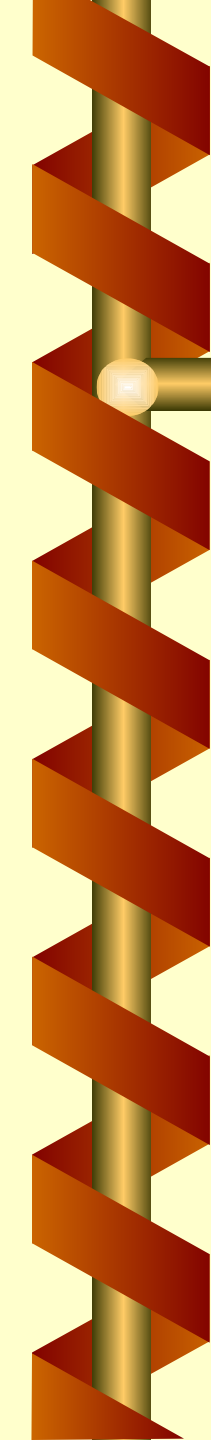
- ❖ Explosive- or powder-actuated tools operate like a loaded gun
- ❖ Tools should not be used in an explosive or flammable atmosphere



Explosive-actuated tools

- ❖ Suitable eye and face protection for the operator and assistants is essential



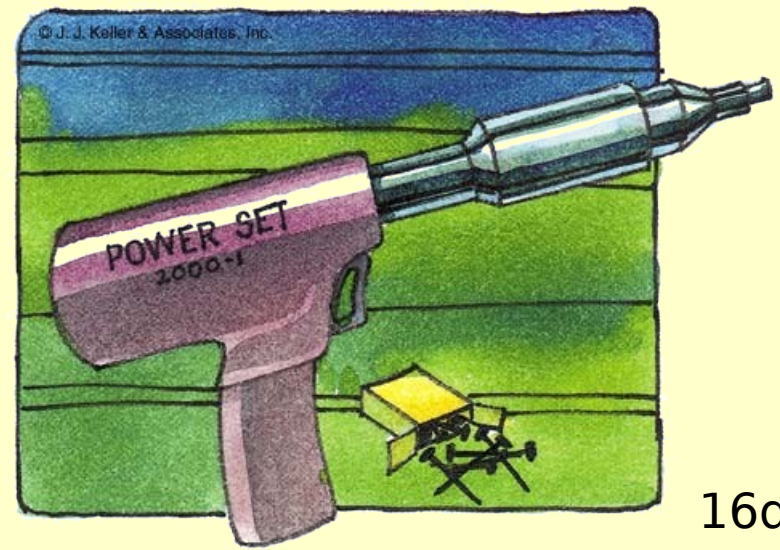


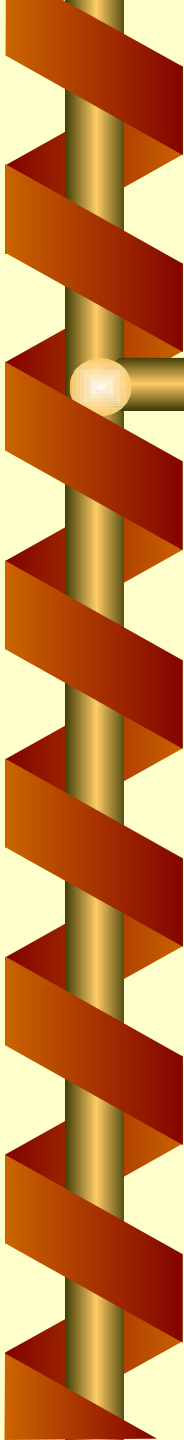
Explosive-actuated tools

- ❖ Before using the tool, the worker should inspect it to determine:
 - that it is clean
 - all moving parts operate freely
 - the barrel is free from obstructions
 - the manufacturer recommended shield, guard, or attachments are in place

Explosive-actuated tools

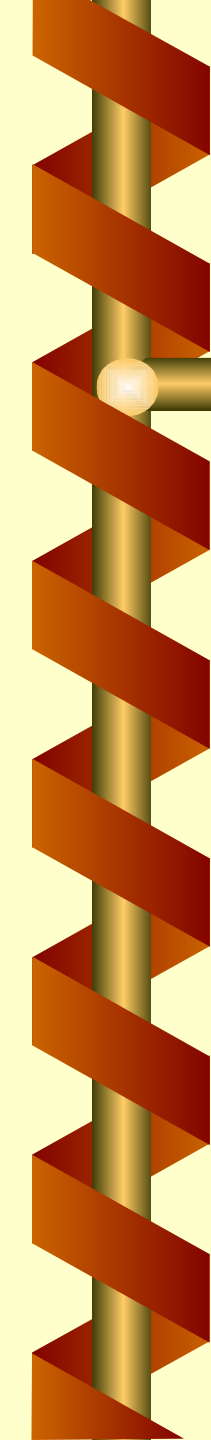
- ❖ The tool must never be pointed at anybody
- ❖ The tool should not be loaded unless it is to be used immediately





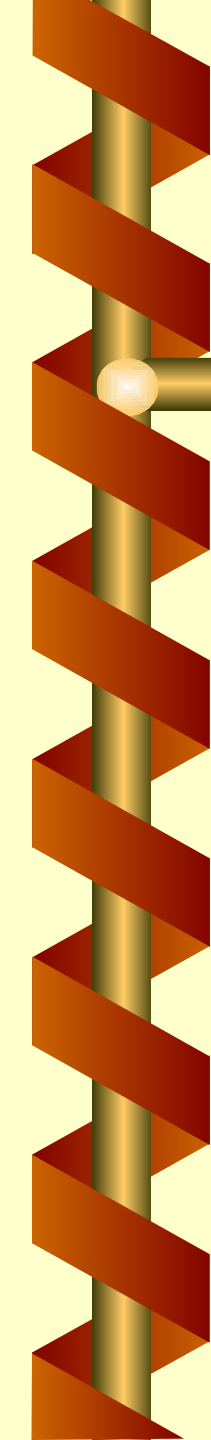
Explosive-actuated tools

- ❖ A loaded tool should not be left unattended
- ❖ Tools must not be available to unauthorized persons
- ❖ Hands should be kept clear of the barrel end



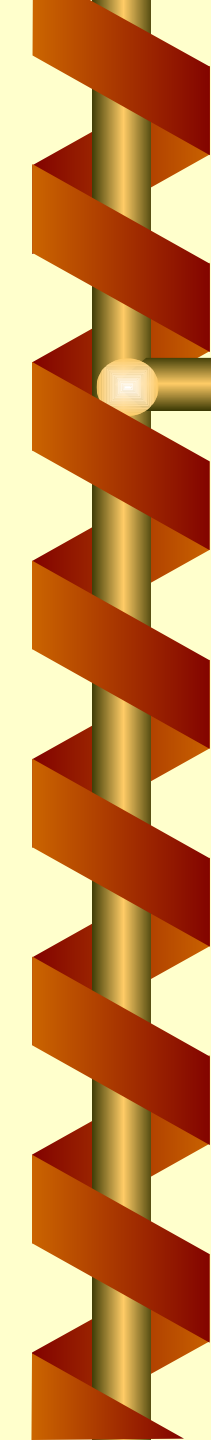
Misfires

- ❖ If an explosive-actuated tool misfires:
 - wait at least 30 seconds
 - then try firing it again



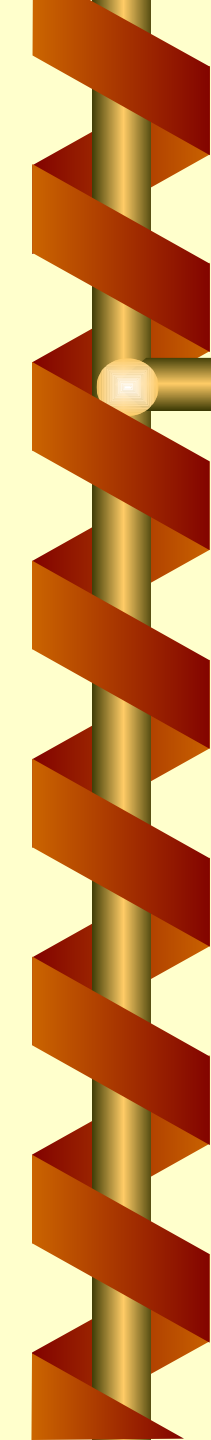
Misfires

- ❖ If it still will not fire:
 - wait another 30 seconds so that the faulty cartridge is less likely to explode
 - carefully remove the load according to the tool manufacturer's instructions
 - place the bad cartridge in water



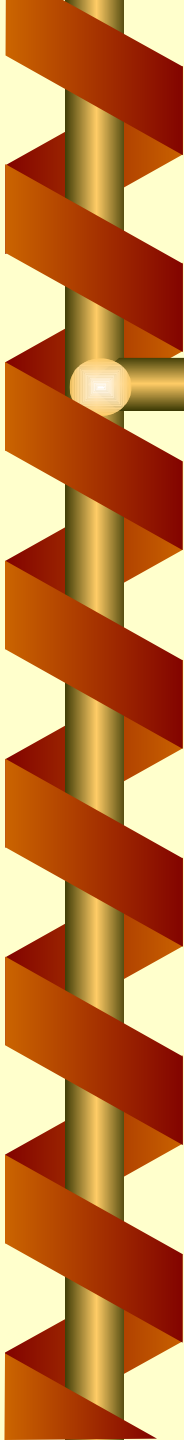
Misfires

- ❖ If the tool develops a defect during use, tag it and take it out of service until repaired
- ❖ Repairs must meet the tool manufacturer's specifications



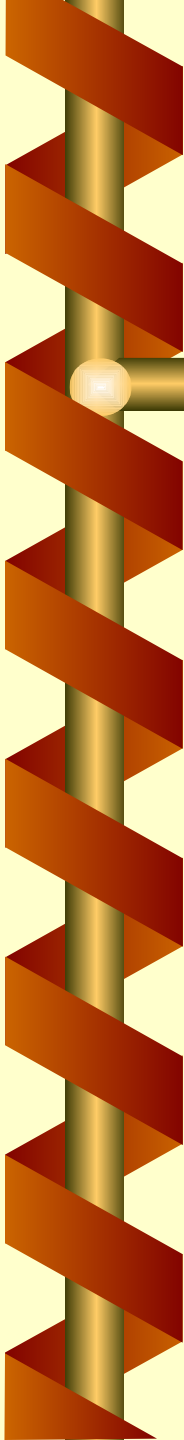
Fasteners

- ❖ Don't fire fasteners must into material that would let them pass through to the other side
- ❖ Don't drive fasteners into very hard or brittle materials



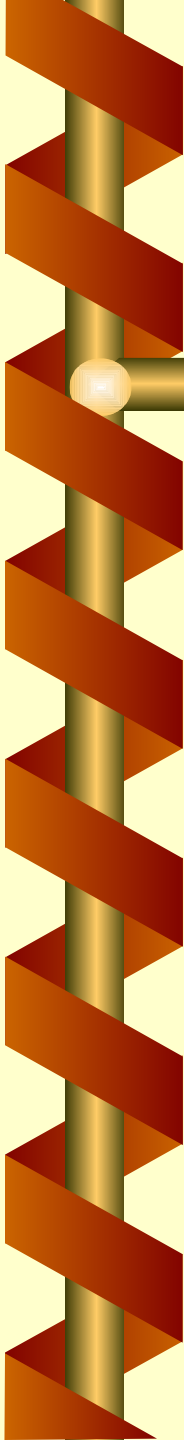
Fasteners

- ❖ Don't use high-velocity tools to drive fasteners into materials (brick or concrete) any closer than 3 inches to an unsupported edge or corner



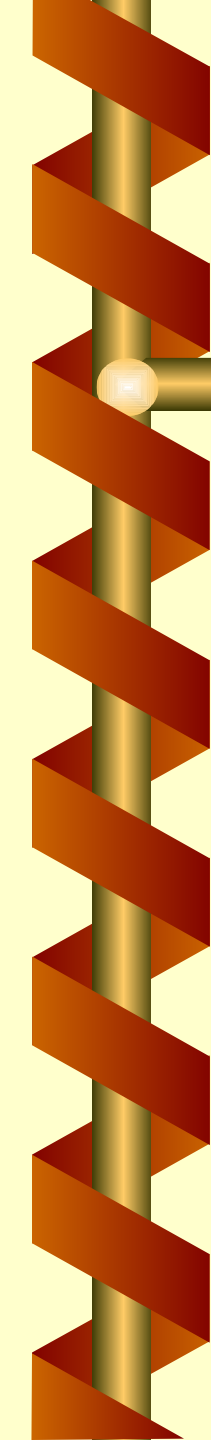
Fasteners

- ❖ Don't use high-velocity tools to place fasteners in steel any closer than 1/2 inch from an unsupported corner edge unless a special guard, fixture, or jig is used



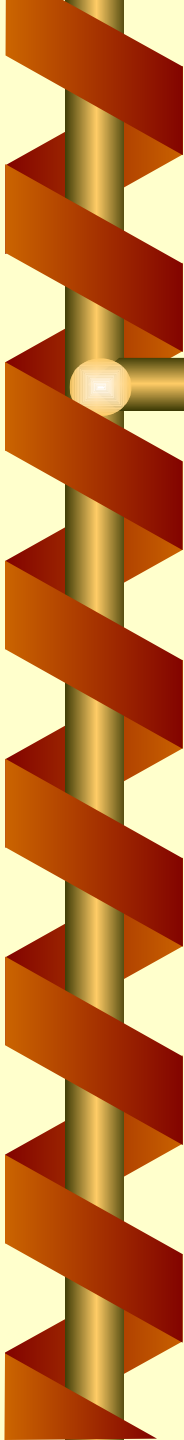
Fasteners

- ❖ Use an alignment guide when shooting a fastener into an existing hole
- ❖ Don't drive a fastener into a spalled area caused by an unsatisfactory fastening



Hydraulic power tool precautions

- ❖ The fluid used in hydraulic power tools must:
 - be an approved fire-resistant fluid
 - retain its operating characteristics at the most extreme temperatures to which it will be exposed



Hydraulic power tool precautions

- ❖ The manufacturer's recommended safe operating pressure for hoses, valves, pipes, filters, and other fittings must not be exceeded

Safe use of jacks

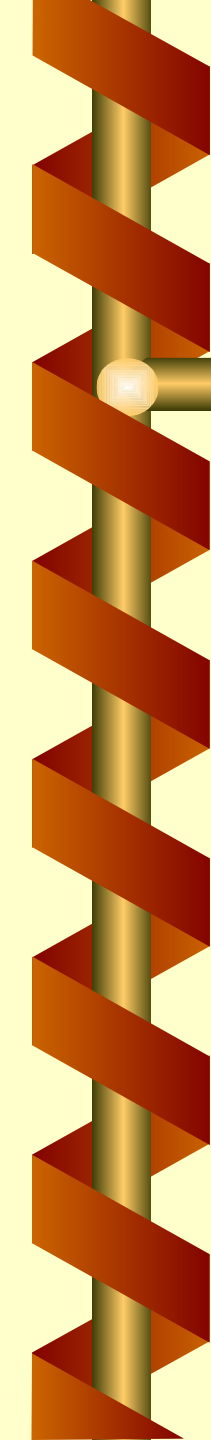
- ❖ All jacks must have a device that stops them from jacking up too high
- ❖ A jack should never be used to support a lifted load



Safe use of jacks

- ❖ Use wooden blocking under the base if necessary to make the jack level and secure





Safe use of jacks

- ❖ To set up a jack, make certain of the following:
 - The base rests on a firm, level surface
 - The jack is correctly centered
 - The jack head bears against a level surface
 - The lift force is applied evenly